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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,429	01/12/2004	Robert S. Nemiroff	BCS03181	9697
43471	7590	05/12/2008	EXAMINER	
Motorola, Inc. Law Department 1303 East Algonquin Road 3rd Floor Schaumburg, IL 60196			WERNER, DAVID N	
			ART UNIT	PAPER NUMBER
			2621	
			NOTIFICATION DATE	DELIVERY MODE
			05/12/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

Docketing.Schaumburg@motorola.com
APT099@motorola.com

Office Action Summary	Application No. 10/755,429	Applicant(s) NEMIROFF ET AL.	
	Examiner DAVID N. WERNER	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20080107</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office action for US Patent 10/755,429 is in response to communications filed 07 January 2008, in response to the interview of 04 January 2008 and the Non-final rejection of 06 July 2007. Currently, claims 1-28 are pending.

2. In the previous Office action, claim 28 was rejected under 35 U.S.C. 101 as non-statutory, and claims 1-28 were rejected under 35 U.S.C. 103(a) as obvious over US Patent 5,687,095 A (Haskell et al.) in view of US Patent Application Publication 2002/0106022 A1 (Sato et al.).

Response to Amendment

3. Applicant's amendment to claim 28 is insufficient to overcome the rejection under 35 U.S.C. 101.

Response to Arguments

4. Applicant's arguments filed 07 January 2008 have been fully considered but they are not persuasive. Applicant argues that it is improper to combine the adjustment factor of Haskell et al. with the normalized activity calculation of Sato et al, since Sato et al. does not compute a normalized spatial activity value "in response to...a function of said adjustment factor".

Claim 1 recites, "determining an adjustment factor relating a number of bits representing a selected frame defined by said bitstream to a target number of bits for

said selected value”, and “computing a normalized spatial activity value for said selected set of video data in response to...a function of said adjustment factor, and claim 9 provides a formula for this calculation. As stated in the prior Office action, the normalized activity calculation of Satoh et al. discloses the formula of claim 9, except Satoh et al. uses a constant value of 2 instead of a function of the adjustment factor. However, since the claims themselves fail to state how the actual number of bits and target number of bits in the frame are related, it is respectfully submitted that this does not preclude a determination of 2 as the best value of the function of the adjustment factor. Applicant is reminded that claims are to be interpreted as broadly as reasonably allowed. In the present case, the determination of the function of the adjustment factor as the ratio of actual bits to target bits would be an improper importation of a limitation from the specification to the claims. See MPEP 2111.01.

An amendment to the independent claims stating that the adjustment factor is **the ratio** between the number of bits representing a selected frame defined by said bitstream to a target number of bits for said selected frame, instead of merely "relating" the actual number of bits and target number of bits, as shown in paragraph 0027 of the specification, would be sufficient to overcome the prior art rejection.

Claim Objections

5. Claim 10 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper

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dependent form, or rewrite the claim(s) in independent form. Claim 10 states that function $f(\text{rcFactor}) = \text{rcFactor}$, and so is a constant function across a video frame. This directly contradicts parent claim 9, which states that $f(\text{rcFactor})$ is not a constant function.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 28 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The relevant portions of the USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (O.G. Notice of 22 November 2005), Annex IV, read as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." *The New IEEE Standard Dictionary of Electrical and Electronics Terms* 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

Both types of "descriptive material" are nonstatutory when claimed as descriptive material *per se*. *Warmerdam*, 33 F.3d at 1360, 31 USPQ2d at 1759. When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure *per se* held nonstatutory).

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Data structures not claimed as embodied in computer-readable media are descriptive material *per se* and are not statutory because they are not capable of causing functional change in the computer. See, e.g., *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure *per se* held nonstatutory). Such claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory.

Similarly, computer programs claimed as computer listings *per se*, i.e., the descriptions or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035. Accordingly, it is important to distinguish claims that define descriptive material *per se* from claims that define statutory inventions.

Computer programs are often recited as part of a claim. USPTO personnel should determine whether the computer program is being claimed as part of an otherwise statutory manufacture or machine. In such a case, the claim remains statutory irrespective of the fact that a computer program is included in the claim. The same result occurs when a computer program is used in a computerized process where the computer executes the instructions set forth in the computer program. Only when the claimed invention taken as a whole is directed to a mere program listing, i.e., to only its description or expression, is it descriptive material *per se* and hence nonstatutory. Since a computer program is merely a set of instructions capable of being executed by a computer, the computer program itself is not a process and USPTO personnel should treat a claim for a computer program, without the computer-readable medium needed to realize the computer program's functionality, as nonstatutory functional descriptive material. When a computer program is claimed in a process where the computer is executing the computer program's instructions, USPTO personnel should treat the claim as a process claim. See paragraph IV.B.2 (b), below. When a computer program is recited in conjunction with a physical structure, such as a computer memory, USPTO personnel should treat the claim as a product claim.

Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, *per se*, and as such are nonstatutory natural phenomena. *O'Reilly*, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in Sec. 101.

On the other hand, from a technological standpoint, a signal encoded with functional descriptive material is similar to a computer-readable memory encoded with functional descriptive material, in that they both create a functional interrelationship with a computer. In other words, a computer is able to execute the encoded functions, regardless of whether the format is a disk or a signal.

These interim guidelines propose that such signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of Sec. 101.

Claim 28, as amended, specifies a "computer readable medium comprising program instructions". This claim language is insufficient to define structural and functional interrelationships between the computer program and the computer-readable medium, as a physical medium cannot "comprise" a data structure. It is suggested that the word "comprising" be replaced with a phrase such as "encoded with" or equivalent.

However, even if claim 28 were amended to proper form, this would fail to present the claim as statutory, since the specification of the present invention, in paragraph 50, defines the claimed computer readable medium as encompassing statutory media such as "storage media" as well as *non-statutory* matter such as "information conveyed to a computer by a communications medium", "information downloaded from the Internet", and "signal-bearing media".

A signal embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the four statutory classes of §101. Rather, a signal is a form of energy, in the absence of any physical structure or tangible material. See *In re Nuijten*, 84 USPQ2d 1495, 85 USPQ2d 1927 (Fed. Cir. 2007, *en banc* denied 2008).

Because the full scope of the claim as properly read in light of the disclosure encompasses non-statutory subject matter, the claim as a whole is non-statutory.

A suggested amendment to claim 28 to overcome this rejection reads, "A computer readable storage medium encoding program instructions...".

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 9 and 23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 9 and 23, as amended, state that function f of an adjustment factor "is not a constant function". This fails to find support in the specification, since the only function f described is the constant function $f(\text{rcFactor}) = \text{rcFactor}$ (paragraph 0033) since it appears that rcFactor is constant throughout a frame. Since no non-constant function f is defined in the specification, the presence of this limitation in claim 9 constitutes new matter, and additionally, provides no direction to a person skilled in the art to make and use the present invention. See MPEP 2163.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 10, 12, 24, and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 10, 12, 24, and 26 state that

the number of bits in a frame of digital video is not equal to a target number of bits. While it is true that this is possible, if not likely, for many frames, the complete exclusion between an actual bit number and target bit number in a frame cannot be discounted completely, such as in a case in which a current frame is identical or nearly identical to a previous frame. An amendment to the claims stating that adjustment is conditional on the number of bits being unequal to the number of target bits, rather than merely dictating that this is indeed the case, would be sufficient to overcome this rejection.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1-9, 11, 13-23, 25, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,687,095 A (Haskell et al.) in view of US Patent Application Publication 2002/0106022 A1 (Sato et al.). Haskell et al. teaches a system for converting a video transmission bit rate. Regarding step (a) of claim 1 and claim 13, Haskell et al. determines the target number of bits per macroblock to be output based on a desired output rate signal and a buffer status signal (column 5: lines 28-31). The buffer status signal is the occupancy rate of a transmission buffer that outputs re-encoded compressed video data at a constant bit rate, and so is a measure of the number of actual bits per frame (column 5: lines 4-12). A macroblock is considered to

meet the claimed "set of video data", and so the claimed "adjustment factor" is proportional to the output rate of Haskell et al. Regarding step (b) of claim 1 and claim 13, Haskell et al. calculates the average number of bits per frame (column 9: lines 8-14). Regarding steps (c) and (d) of claim 1 and claim 13, Haskell et al. calculates a target number of bits per frame and per macroblock based on a constant, the target video output rate, the maximum frame rate, and the total number of macroblocks in the frame. The target macroblock rate corresponds with the activity of "sets", and the target frame rate corresponds with the activity of the "set of sets", as well as the target number of bits for a frame in step (a). However, Haskell et al. does not teach normalizing the spatial activity value, as required in step (d) of claim 1 and claim 13.

Regarding claims 2 and 14, in one embodiment of Haskell et al., the amount of data output is controlled by requantizing the DCT coefficients of a macroblock (column 10: lines 49-57). Regarding claims 3 and 15, after processing one macroblock, the system of Haskell et al. updates the buffer status and the control signal controlling the adjustment to the amount of data to be output (column 9: lines 42-65). Regarding claims 4 and 16, after processing a macroblock, Haskell et al. checks to see if a frame is finished, and if it is, updates frame parameters (column 10: lines 4-8). Regarding claims 5 and 17, after processing each frame, Haskell et al. recalculates the number of bits per frame, target bits for the next frame, and the control signal (column 10: lines 8-22).

Regarding claim 6, in one embodiment of Haskell et al., the difference between targeted bits per macroblock and actual bits per macroblock determines the number of

DCT indices to be retained and the number to be suppressed to zero (column 9: line 60–column 10: line 3). Regarding claim 7, in Haskell, the values of DCT coefficients are directly proportional to the quantization parameter. Therefore, by adjusting the quantization parameter, coefficient values are inherently adjusted. Regarding claim 8, in one embodiment of Haskell et al., the difference between targeted bits per macroblock and actual bits per macroblock determines the size of the DCT quantization parameter (column 11: lines 56-63).

Regarding claim 20, Haskell et al. preferably operates on H.261 video, which encodes macroblocks with the Discrete Cosine Transform, or DCT (column 4: lines 27–29). Regarding claims 21 and 22, H.261 coding was known to encode each macroblock with six DCD block, including four luma blocks and two chroma blocks (column 7: line 62–column 8: line 22). Since claim 21 does not state that determining spatial activity is performed "only" among luma blocks, a determination of spatial activity according to both H.261 luma and chroma blocks is within the scope of both claims 21 and 22. Regarding claim 26, figure 1 of Haskell et al. shows decoder 104, DCT coefficient processor 107, encoder 109, and controller 113. Regarding claim 27, these components are considered equivalent to those shown in figure 1 and described in the specification of the present invention, and so fall within the limitations implied by 35 U.S.C. 112, sixth paragraph, according to the means-plus-function language of the claim. Regarding claim 28, the system of Haskell et al. may be implemented on a general-purpose microprocessor, a DSP, or a programmable video-processing chip (column 14: lines 24-30).

The presently claimed invention encompasses specific calculations for the spatial activity value in response to specific data in the video, as shown in claims 6-8, and the calculation of a normalized spatial activity value, for example, in claims 1d and 9. However, Haskell et al. does not show these limitations.

Satoh et al. teaches a transcoder for converting from MPEG-2 video to MPEG-4 video. Regarding claim 1d, 9, 13d, and 23, equation 22 of Satoh gives a normalized activity calculation identical to that presently claimed, except $f(rcFactor)$ is set to 2, thus producing a range of 0.5 to 2. However, it would have been obvious to one having ordinary skill in the art to further adjust the multiplier of the normalized activity calculation to a different range, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimal or workable range involves only routine skill in the art. See *In re Aller*, 105 USPQ 233. **Applicant is again reminded that this rejection would be overcome by specifying that the adjustment factor is the ratio of the number of bits in a frame and a target number of bits in the frame.**

Regarding claim 6 and 7, in Satoh et al., global complexity measure X for a frame is determined according to S, the number of coded bits in a picture (paragraph 0021). Since MPEG-2 and MPEG-4 use variable-length coding techniques in which larger DCT coefficients take more bits than small coefficients, a high number of bits per picture may indicate a high number of DCT coefficients or large values thereof. Regarding claim 8, global complexity measure X is also dependent on Q, the average quantization scale code for the frame (paragraphs 0021-0022).

Haskell et al. discloses the claimed invention except for details of measuring data complexity. Satoh et al. teaches that it was known to measure video frame complexity according to both the number of coded bits per frame and the quantization scale for a frame. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to generate a picture complexity measure according to specific picture details as taught by Satoh et al., since Satoh et al. states in paragraph [0025] that such a modification would be useful to generate an accurate calculation for the number of bits to allocate to a transcoded frame.

Regarding claims 11 and 25, the function $f(rcFactor) = rcFactor$ is piecewise continuous across its domain.

Regarding claim 18, Satoh et al. keeps separate global complexity measures and separate allocation bit amounts for I-frames, P-frames, and B-frames (paragraphs 0021, 0025), and so only compares frames with other frames of the same type, and regarding claim 19, in Satoh et al, the quantization scale for a B-frame is kept at 1.4 times that of an I-frame or P-frame (paragraphs 0023-0024).

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner, whose telephone number is (571)272-9662. The examiner can normally be reached on MWF from 9:00-6:30, TR from 9:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/D. N. W./
Examiner, Art Unit 2621

/Mehrdad Dastouri/
Supervisory Patent Examiner, Art Unit 2621